

STUDIES ON IMMUNITY.

Studies on Immunity. By Prof. Robert Muir, in collaboration with Drs. Carl H. Browning, Alexander R. Ferguson, and William B. M. Martin. Pp. xi+216. (London: Henry Frowde, and Hodder and Stoughton, 1909.) Price 7s. 6d. net.

THIS book contains a record of original work on the theory of immunity carried out during the past six years by Prof. Muir, of Glasgow University, in collaboration with his colleagues, Dr. Browning, Dr. Ferguson, and Dr. Martin. Eleven original papers, all of which have already appeared in various scientific journals, are incorporated in the present volume, but, by judicious alterations and additions, the author has endeavoured to knit the subject-matter of these papers into one continuous whole, so that the volume serves as a connected account of the particular immunity processes (hæmolysis and opsonic action) with which the author deals.

A work which treats in strictly scientific fashion of questions so difficult and complicated as those of hæmolysis and opsonic action must of necessity appeal only to the expert, and it is unfortunate that Prof. Muir has not seen fit to bring the subject up to date by the inclusion of references to papers which have appeared since the publication of the authors' original researches. Had he done so, the book would have appealed far more forcibly to the present-day worker, who, one may presume, has been for some time familiar with these highly important researches of Prof. Muir and his collaborators.

The volume opens with an interesting chapter on the properties of hæmolytic sera generally, and the technique usually employed in the investigation of hæmolytic phenomena. There follow chapters on the mode of union of the immune body with the red corpuscle, and the relation of this union to complement action. With regard to this latter question, Prof. Muir finds himself in agreement with Bordet, whose view is that there is no direct union of immune body with complement, as Ehrlich supposed, but that the complement unites with the cell receptor, which has, so to speak, been sensitised by the immune body. "A complementophile group in the amboceptor is not proved, and the use of the term 'amboceptor' does not appear to be justified." Certain interesting filtration experiments performed by Prof. Muir and his colleagues showed very convincingly that at 37° C. a direct union of immune body with complement was highly improbable. The question of complementoids is discussed in great detail, and the author believes that Ehrlich's views with regard to these bodies have been completely confirmed.

Some interesting researches are described showing that complement may act as an agglutinin. Thus, if a certain amount of immune body (obtained by immunising an animal with the red cells of the ox) be added to ox corpuscles in the presence of ox complement, scarcely any lysis occurs, but marked agglutination of the red cells takes place. If guinea-pig's complement is employed, lysis, of course, occurs, and if the ox serum be now added, the stromata flocculate as before. Like complement, this agglutinating body in ox serum is thermostable, and acts only in

cooperation with immune body. Whether this agglutinating complement and the ordinary lytic complement are one and the same, further research must determine.

Anti-immune bodies and anti-complements are treated at great length, and a considerable amount of space is devoted to the question of the deviation of complement, a process which forms the basis of numerous diagnostic methods of great practical importance. The delicacy of this reaction is compared with that of the precipitin method as a test for the presence of protein of human origin.

The concluding chapters of the book deal with the authors' experiments on the opsonic action of normal and immune sera. In view of their finding that the opsonic action of a normal serum could be almost entirely removed by saturating it with sensitised red cells or other combinations which absorb complement, they came to the conclusion that the opsonins of normal serum belong to the group of complements. This view, which attributes to complement an entirely novel property of acting alone, and takes no account of the presence of normal amboceptors, has not met with general acceptance, and a considerable amount of evidence has accumulated in the last two years, showing that in normal serum, as well as in immune serum, amboceptors cooperate with complement to produce an opsonic effect. One cannot yet say, however, that the question whether the opsonic action of normal sera is strictly analogous to that of immune sera is definitely settled, and in the last chapter of the book Prof. Muir brings forward evidence that in some cases normal bactericidal action may differ from that which takes place through the medium of an artificial immune body. Normal bactericidal action may, in fact, follow from the direct union of complement with the bacterium, and not necessarily from an indirect union through the medium of a natural amboceptor. All workers interested in these questions will find Prof. Muir's book worthy of careful perusal.

THE SCIENCE OF EDUCATION.

Psychologie de l'Enfant et Pédagogie expérimentale. By Dr. Ed. Claparède. Second edition. Pp. viii+283. (Geneva: Librairie Kundig, 1909.) Price 3.50 francs.

THE second appearance of Dr. Claparède's book in a greatly enlarged form is an excellent indication of the interest which has been aroused by the effort of recent years to give a scientific basis to the practice of education. If further evidence were wanted, it will be found in the opening chapter, which gives a brief account of the development of the movement and of the literature of the subject. Child-study societies and child-study journals have an almost world-wide currency—from Japan in the Far East to California in the Far West. No doubt there is more zeal than science in much of the published work, but the critic is already at work, and we may hope that science will follow in his wake.

Dr. Claparède is a psychologist, and the interest of the book is mainly psychological. As a justification for the subtitle he makes certain pedagogic deductions, not, however, as tentative hypotheses upon which experimental inquiry may be founded, but rather

as so many statements of fact. This seems unfortunate, and students of education who take up the book in the hope of deriving guidance and inspiration in their own class-room investigations will surely feel some disappointment. The dogmatic spirit in which the author treats certain fundamental issues is not reassuring. He finds, for example, that the prime motive power in the mental development of the young, is their inborn tendency to play and to imitate. Groos's interpretation of play is, in the main, accepted, and we are led into a strongly-worded plea for "attractiveness" as the sole principle in educational practice. The plea is backed up with the "best opinion," and ends thus:—

"It is true that certain scholastic successes may be obtained by the opposite method. But see later what the effect upon the victims is! Worked out at school, they are left without initiative, and the power of energetic action. They never become men because they have never been children."

This sweeping generalisation applies avowedly to the whole school system. Not a word of evidence is put forward in its support, though probably few of the readers of the book would regard it as a self-evident proposition. It is not a satisfactory method of laying the foundations of a science of education.

The author is more successful as an exponent of child-psychology pure and simple. He gives a brief summary of the various sources of our knowledge, and his chapter on mental development is a useful introduction to current views on the subject of play, imitation, and interest from the standpoint of biology. The student who is anxious to learn something of actual methods of research will find references to special monographs in the bibliographies appended to each chapter. It is only when he treats the subject of fatigue that the author himself gives detailed accounts of experimental methods the value of which readers can test for themselves. The curves which are given in the text of earlier chapters, showing the variations in suggestibility &c., at different ages, embody results of investigations the character and significance of which are not in any way discussed. Perhaps in a later edition the author may find it possible to strike out what is mere dogmatism, and enlarge upon those parts of his book which deal with scientific inquiry. The value of the book might in this way be greatly increased.

J. A. GREEN.

BOOKS OF REFERENCE IN ORGANIC CHEMISTRY.

- (1) *Analyse und Konstitutionsermittelung organischer Verbindungen*. By Dr. Hans Meyer. Second enlarged edition. Pp. xxxii+1003. (Berlin: J. Springer, 1909.) Price 28 marks.
- (2) *V. v. Richter's Chemie der Kohlenstoffverbindungen oder organische Chemie*. By Dr. R. Anschütz and Dr. G. Schroeter. Erster Band, Die Chemie der Fettkörper. Pp. xx+793. (Bonn: F. Cohen, 1909.) Price 18 marks.
- (1) **T**HE study of structure may be looked upon as the basis of all investigation in organic chemistry. It is the fundamental distinction between this and other branches of the science.

NO. 2077, VOL. 81]

Whilst physical chemistry is chiefly concerned with the mechanism of reactions, inorganic chemistry with the conditions determining the formation of compounds, organic chemistry is mainly directed to synthetic processes, for which a knowledge of structure is essential. It is as an aid to this knowledge that Dr. Meyer's book has been written. That it has found favour with chemists and is regarded as a valuable addition to chemical literature is shown by the fact that within a few years of its first appearance the publication of a new and enlarged edition has been called for.

The volume before us has reached the respectable bulk of one thousand pages. The chief addendum is the second part, on the determination of the parent substance, containing chapters on oxidation, reduction, and alkaline fusion; many new methods have also been introduced, and older and less trustworthy ones discarded.

The book is too well known to need anything in the way of general description. It contains methods of elementary analysis, methods for determining molecular weights, for ascertaining qualitatively and quantitatively the presence of certain groups, and for breaking up the molecule into simpler fragments. One may look in vain for any serious omissions. On the other hand, the great variety of methods and the long lists of references are rather bewildering, and constitute, perhaps, the chief defect of the book. There has been, apparently, no attempt at critical examination. Every method and every modification of it seems to have found a place. The reader is left to make his own choice and to draw on his own experience.

We would take as an illustration the well-known method of Zeisel. The original and obsolete form of apparatus is described and pictured in detail, together with modifications by Benedikt and by the author (the latter being described as the simplest and most convenient), whilst the method of Perkin, generally adopted in this country, is only indicated by a reference along with five others.

We would not press this criticism too far. It is better to have too much information than too little, and if the reader has not the luck to discover at once the most suitable process, he will hit upon it in the end if he only perseveres.

It is needless to point out that the compilation of so much detail must have entailed immense labour, and has been carried out with painstaking German thoroughness. The book is well printed and illustrated, and should serve as a standard work of reference in the library of an organic laboratory.

(2) Twenty-five years ago Richter's "Organic Chemistry" appeared as a small companion volume to the one on inorganic chemistry. Since then each succeeding edition has steadily increased in bulk. A few years ago it was issued in two parts, and now it has been found necessary to enlarge the *format*. Nothing could illustrate more forcibly the growth of this branch of chemistry.

Whatever may have been the original purpose of the book, it has long ceased to be a text-book for